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Gut Microbiota-Brain Interaction with Special Reference to Alzheimer's disease

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Gut microbiota is showing and raising evidence that the dynamic changes in the gut microorganism can influence physiology and behavior of brain. Dysbiosis or dysbacteriosis is a condition of microbial imbalance inside the intestinal microbiome. It has been associated with disorders of intestinal and extra-intestinal such as inflammatory bowel disease and other multiple diseases like asthma, diabetes mellitus, rheumatoid arthritis and autism. Microbial dysbiosis is also linked to neurodegenerative disease like Alzheimer and Parkinson. Gut microflora and brain have dynamic bidirectional relationship. Butyrate synthesized by the gut bacteria through the fermentation of nondigestible fibers or polysaccharides. Butyrate obtained from gutmicrobiota has a noteworthy impact on the health of the gut, but the effects of butyrate go away from the colon to the brain. Butyrate has a most important effect on gene expression especially in the brain. It functions like a histone deacetylase inhibitor (HDAC) affective to the gene activation in brain. Butyrate can protect cell death of brain neurons from conditions like Alzheimer disease (AD). It has a weighty impact on memory and help in improving capacity of learning especially in condition like dementia. In some studies it has found that butyrate played an important role in cell repairing mechanism and provides protection against cell damage from toxic metals. In humans, it is reported that metals like mercury, lead and copper are concerned in dementia in Alzheimer disease susceptible patients.

Key words: Gut microbiota, Dysbiosis, Alzheimer disease, Histone deacetylase inhibitor (HDAC), Brain.